



PATENT SPECIFICATION

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COMPLETE SPECIFICATION

A method of manufacturing a feeding stuff for animals, in particular fowls

We, P. O. STOKKEBYES KVARNAKTIEBOLAG, a Swedish Company, of Odinsgatan 6, Gothenburg, Sweden, do hereby declare the invention, for which we pray that patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Feed-lime	1 kg	
Feed-bonedust	1 ..	
Common salt and traces of certain metal salts and vitamins and antibiotics	1 ..	45
	100 kg	

10 In the feeding of domestic animals, such as fowls, the feed eaten by the animal each day should be composed of a variety of different components in order that growth or, as regards fowls, production of eggs, shall take place in the most favourable way from the economic aspect. The feed ration should contain carbohydrates, fat, protein, mineral substances and vitamins. Some of these substances, such as the protein, should be of animal as well as of vegetable origin in order that the feed shall have a composition satisfying various important requirements from the point of view of nutrition. It is also important that the feed ration includes said ingredients in certain suitable proportions.

25 Consequently, a suitable feed is produced by grinding and mixing the constituents in suitable proportions to a powdered composite feed mixture which may, for instance, have the following composition:—

Grits of barley	20 kg
Grits of oats	20 ..
Fine brans of wheat	13 ..
Feed meal from wheat	16 ..
35 Linseed cake meal	4 ..
Peanut cake meal	2 ..
Soy-meal	6 ..
Rape-meal	3 ..
Fish-meal, dried	6 ..
40 Meat-meal, dried	3 ..
Lucern-meal	4 ..

[Price 3s. 0d.]

Of the above constituents, grits of barley, grits of oats, fine brans of wheat and lucern-meal contain crude fibre the proportion of which in relation to the entire mixture amounts to several percent.

In order that chickens or fowls shall grow quickly or produce the greatest possible number of eggs, they have to eat each day as much feed as possible of a composition suitable for the purpose. In order to attain this, the feed mixture usually is given in the form of a dry powder. In this form of feeding, however, certain inconveniences arise. A considerable proportion of the feed is lost because the fowls spill it on the ground or in dung or throw it about in such a manner that it cannot be plucked up by them. In order to reduce the losses by spilling, it has been attempted to transform the feed into granule, pill or pellet form by compressing the powder with or without binding agents. The feed pellets manufactured and sold are in the shape of spheres, cubes or short cylinders, and appear to cause certain swallowing troubles for the chickens or fowls. By the use of pellets the spill losses have been reduced and the degree of utilization of the feed has been thereby increased, but it is difficult to cause the fowls to eat a sufficient quantity by weight of this compact form.

In feeding tests it has, however, been proved that if the powdered feed is transformed into relatively thin flakes of sufficient strength, one attains both objects desired i.e.,

the fowls eat more and the spilling percentage is small.

It has, however, been difficult to transform a powdered feed mixture in an economic manner into the shape of flakes having sufficient strength.

The present invention solves this problem and is chiefly characterized by the fact that a dry, powdered feeding stuff mixture consisting of vegetable feed products about 10-96%, animal feed products about 1-50%, mineral substances about 0.2-15% of the weight of the mixture, and the remainder amounting to about 0.01-3% consisting of vitamins and/or antibiotics and/or trace elements, and containing substances, such as starch and animal substances, forming with water or steam colloidal binding agents, and between 1-25% crude fibres, is treated with steam and/or water so as to form such binding agent, thereby forming a plastic mass of the feeding stuff mixture and the binding agent, and flakes of a thickness between about 0.5-1.5 mm. are formed from said plastic mixture. According to one embodiment of the invention only the constituents of the mixture which will give the binding agent or agents, are treated with steam and/or water, whereupon the remaining constituents are mixed in after said treatment and the mixture thus obtained is transformed into said bodies from which the flakes are formed.

In a suitable manner of treating powdered feeding stuff mixture and the moist mass produced from same with heat and steam, it has been proved that vegetable feeding stuffs containing a relatively large proportion of starch and wheat brans, grits of oats and barley brans, will generally be rendered easier for the animals to digest by treatment with moist heat, such as steam.

Protein substances in the feeding stuffs are more liable to get damaged by heat and steam. Proteins of the cereals will stand moist heat rather well, but in some feeds, which as well as vegetable ingredients contain substances of animal origin, such as fish-meal, meat-meal, casein and glue, the protein may be decomposed or rendered more difficult to digest by moist heat, in particular in the presence of sugars. In particular, the protein of hide glue begins to be destroyed if the temperature exceeds about 60°C. Thus, some powdered feeding stuff mixtures should not be treated with steam with higher temperature (such as 100°C) but the treatment should be effected with steam without heating the main mass of the mixture to a temperature above 60°C (50°C, for example). Other easily damaged feeding stuffs should not be treated with steam and should also be dried very cautiously at a relatively low temperature not exceeding 50-60°C. Thus, in the manufacture of feeding

modated according to the degree of heat stability of components of the feed.

The treatment with water and/or steam is carried out with advantage in a continuously operating screw conveyor into which steam and/or hot water is supplied directly and which also is heated indirectly. The moist mixture is then treated in a continuously operating screw press, the mixture being extruded through holes in the form of strings which are cut to bodies of suitable length. These bodies are immediately pressed between rolls and are then fed on to a continuously operating conveying device on which they are dried to a suitable percentage of moisture.

The treatment with steam and/or water is regulated in such a manner that the total percentage of moisture of the moist mass is between 12-45% of the weight of the mass.

The details of the present method may be varied in many ways but in order to further illustrate the invention the following examples are given.

Example 1.

The constituents mentioned in the preamble are mixed together in dry condition with the exception of a small portion of the feed meal from wheat which is rich in starch. About 3kg of the latter are boiled with about 30 litres of water to a paste which in hot condition is thoroughly mixed with the remaining dry mixture of the feeding stuffs amounting to about 97kg whereby a moist mass with a temperature of about 35-40°C is produced. For economic reasons, the addition of water should be as small as possible but sufficient to enable creation of a plastic mass, since the surplus water has then to be removed. This plastic mass is extruded in a screw press through nozzles to strings with a diameter of about 3mm, said strings being automatically cut off to short cylindrical bodies with a length of about 3-4mm. Owing to the percentage of crude fibre, these bodies will maintain their shape and will not crumble since they are reinforced by said fibres. Said cylindrical bodies are then immediately fed to a rolling machine with rotatable smooth rollers by which they are pressed to flakes having a thickness of about 0.5-1.5mm, preferably about 0.7mm. The flakes are then dried by hot air with a temperature of 40-50°C or in other suitable way so that they have a good strength after drying.

According to another embodiment of the invention, the whole feed mixture with the exception of the vitamins and antibiotics, which are easily destroyed by heat and moisture, is treated with moist steam in a screw conveyor which moves the mass continuously to a mixer in which it may also

be somewhat cooled if required. The vitamins and antibiotics are now mixed in the mass which is then pressed out and rolled as stated in Example 1. In this way the vitamins, some of which are liable to be damaged by heat, will not be destroyed, and at the same time the steam treatment renders the feed constituents easier for the animals to digest which increases the value of the feed.

The composition of the powdered feeding stuff mixture may be varied within rather wide limits. Thus it may consist of feed constituents of the following kinds, viz. vegetable feed products about 10-96%, animal feed products about 1-50%, mineral substances about 0.2-15% of the weight of the mixture, and the remainder amounting to about 0.01-3% consisting of vitamins and/or antibiotics and/or trace elements.

Example 2

A powdered mixture of about
85 kg of vegetable feed stuff
12 kg of animal feed stuff
2.8 kg of mineral substances
0.2 kg of vitamins, antibiotics and trace elements in total

is mixed with a solution of a binding agent produced by boiling about 0.8kg of feed meal from wheat or rye, and about 0.8kg of meal of pressed cakes from linseed oil mills, so called linseed cakes, with 16 litres of water. The mixture is worked up and from the same, thin strings are formed by extrusion out of a suitable screw or piston press through nozzles, said strings being cut into short pieces which are then pressed to flakes. The proportion of feed meal from wheat or rye may vary between about 0.2-4kg per 100kg of the dry powdered mixture, and the proportion of said pressed cakes from linseed oil mills likewise may vary between about 0.2-4kg per 100kg of the dry powdered mixture.

The powdered feeding stuff mixture may also be treated with steam before the addition of the solution of the binding agent.

According to a further embodiment of the present invention, the binding agent may be prepared from animal glue such as bone or hide glue alone or together with other binding agent or agents. This solution may, for instance, be produced from about 0.7kg of so called pearl glue in 16 litres of water, and this solution is added to the dry feed stuff mixture, which previously may be heated by direct steam in order to soften constituents with fibrous structure if required.

The solution of the binding agent may, instead, consist of a paste produced from skim milk or from dried skimmed milk powder dissolved in water. Another manner of producing the binding agent or paste

consists in boiling and washing potatoes in the water used for the boiling.

The powdered main mass of the feeding stuff may be treated with steam separately at a temperature below about 70°C, whereupon the water mixture of the binding agent is mixed in.

What we claim is:—

1. A method of manufacturing a feeding stuff mixture particularly for chickens and other fowls, wherein a dry, powdered feeding stuff mixture consisting of vegetable feed products about 10-96%, animal feed products about 1-50%, mineral substances about 0.2-15% of the weight of the mixture, and the remainder amounting to about 0.01-3% consisting of vitamins and/or antibiotics and/or trace elements, and containing substances such as starch and animal substances, forming with water or steam colloidal binding agents, and between 1-25% crude fibres, is treated with steam and/or water so as to form such binding agent, thereby forming a plastic mass of the feeding stuff mixture and the binding agent, and flakes of a thickness between about 0.5-1.5 mm. are formed from said plastic mixture.

2. A method as claimed in claim 1 wherein only the feeding stuff constituents, which will give the colloidal binding agents, are treated with steam and/or water, after which treatment the remaining constituents are added whereupon the mixture thus obtained is transformed by pressure into the bodies from which the flakes are formed.

3. A method as claimed in claim 1 wherein a hot binding agent mixture is prepared from water and linseed meal with or without the addition of meal from cereals, this mixture being then mixed with the powdered main mass of the feeding stuff.

4. A method as claimed in claim 3, wherein the proportion of binding agent in relation to the weight of the powdered feeding stuff mixture is about 0.2-4% of meal of press cakes from linseed oil mill, so called linseed cakes, and about 0.2-4% of feed meal from cereals, preferably wheat or rye.

5. A method as claimed in claim 2 wherein the binding agent consists of animal glue, such as ordinary bone or hide glue alone or together with other binding agent or agents.

6. A method as claimed in claim 2 wherein the binding agent consists of skim milk or dried skimmed milk powder dissolved in water.

7. A method as claimed in claim 2 wherein the binding agent consists of a paste prepared by boiling and mashing potatoes.

8. A method as claimed in claims 6 and 7 wherein the powdered main mass of the feeding stuff is separately treated with steam at a temperature below about 70°C, after

which the water mixture of the binding agent is mixed in.

- 5 9. A method as claimed in claim 1 wherein the total percentage of moisture in the moist feeding stuff mixture is about 12-45% of the weight of the feeding stuff mixture.

- 10 10. A method as claimed in any of the claims 1-9 wherein the treatment with water and/or steam is effected in a continuously operating screw conveyor into which steam and/or hot water is conducted directly and which is also heated indirectly.

- 15 11. A method as claimed in any of the claims 1-10, wherein the moist mixture is treated by pressure in a continuously operating screw press, the mixture being pressed through holes into the form of

strings which are cut off to bodies of suitable length.

- 20 12. A method as claimed in claim 11, wherein the bodies obtained are immediately pressed between rollers and are then fed on to a continuously operating conveying device on which they are dried to a suitable percentage of moisture.

- 25 13. A feeding stuff produced by any of claims 1-12.

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